



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
(Case No. 213.002-D1-US)

In the Application of: **Ye et al.**

Serial No: **10/646,313**

Filed: **August 22, 2003**

Title: **SYSTEM AND METHOD FOR LITHOGRAPHY  
PROCESS MONITORING AND CONTROL**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

) Group Art Unit:

) Before Examiner

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on January 9, 2004

Date  
Michelle Sites  
(person signing this certificate)

Michelle Sites  
Signature

**FIRST INFORMATION DISCLOSURE STATEMENT**

Dear Sir:

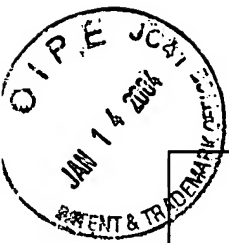
Submitted herewith are eight (8) sheets of a modified Form PTO-1449. All of the documents listed on the modified Form PTO-1449 were provided or cited in the parent application of the above-captioned application. Accordingly, the documents are not enclosed herewith. (See 37 C.F.R. §1.98(d) and MPEP 609). Should the Examiner desire an additional copy of the documents, kindly contact the undersigned.

It is respectfully requested that the Examiner make his/her consideration of these references formally of record with the initial Office Action.

Respectfully submitted,

Date: January 9, 2004

Neil A. Steinberg  
Reg. No. 34,735  
650-968-8079



PTO-1449 (Modified)  U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE  INFORMATION DISCLOSURE STATEMENT BY APPLICANT	ATTY. DOCKET NO. <b>213.002-D1-US</b>	SERIAL NUMBER <b>10/646,313</b>
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## U.S. PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE
	4,585,342	4/1986	Lin et al.			
	4,701,606	10/1987	Tanimoto et al.			
	4,929,083	5/1990	Brunner			
	5,202,748	4/1993	MacDonald et al.			
	5,481,624	1/1996	Kamon			
	5,629,772	5/1997	Ausschnitt			
	5,631,731	5/1997	Sogard			
	5,795,688	8/1998	Burdorf et al.			
	5,828,455	10/1998	Smith et al.			

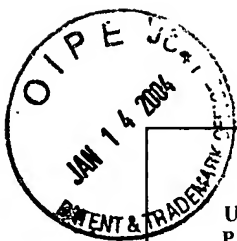
## FOREIGN PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION YES/NO	
	EP 0 628 806	4/1994	European				

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	"A New Mask Evaluation Tool, the Microlithography Simulation Microscope Aerial Image Measurement System", Budd, et al., SPIE Vol. 2197, 1994, pp.530-540
	"Characterization of Lithographic System Performance Through Direct Aerial Image Measurements", C.H. Fields, SRC/SEMATECH, 1996 (96-MC-500)
	"Aerial Image Measurements on a Commercial Stepper", Fields, et al., SPIE Vol. 2197, 1994, pp.585-595
	"A Novel High-Resolution Large-Field Scan-and-Repeat Projection Lithography System", K. Jain, SPIE Vol. 1463 Optical/Laser Microlithography IV, 1991, pp.666-677
	"Direct Aerial Image Measurements to Evaluate the Performance of an Extreme Ultraviolet Projection Lithography System", Fields, et al., J. Vac. Sci. Technol. B, Vol. 14, No. 6, Microelectronics and Nanometer Structures, Nov/Dec 1996, pp.4000-4003
	"Direct Aerial Image Measurement as a Method of Testing High Numerical Aperture Microlithographic Lenses", Partlo et al., J. Vac. Sci. Technol. B, Vol. 11, No. 6, Nov/Dec 1993, pp.2686-2691

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## U.S. PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE
	5,888,675	3/1999	Moore et al.			
	5,898,479	4/1999	Hubbard et al.			
	5,969,639	10/1999	Lauf et al.			
	5,978,085	11/1999	Smith et al.			
	6,268,093	7/2001	Kenan et al.			
	6,335,220	1/2002	Shioyama et al.			
	6,356,345	3/2002	McArthur et al.			
	2001/0055415	12/2001	Nozaki			
	2002/0003216	1/2002	Kida et al.			

## FOREIGN PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION YES/NO	

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	"In Situ Measurement of an Image During Lithographic Exposure", Brunner et al., IEEE Electron Device Letters, Vol. EDL-6, No.7, July 1985, pp.329-331
	"Improving Photomask Linewidth Measurement Accuracy via Emulated Stepper Aerial Image Measurement", J. Potzick, SPIE Vol. 2322, Photomask Technology and Management, 1994, pp.353-359
	"Pattern Shape Analysis Tool for Quantitative Estimate of Photomask and Process", Yonekura, et al., Proceedings of SPIE Vol. 4409, Photomask and Next-Generation Lithography Mask Technology VIII, 2001, pp.204-211
	"Meeting the Challenge of Advanced Lithography Reticle Inspection", Zurbrick et al., SPIE Vol. 2322, Photomask Technology and Management, 1994, pp.7-15
	"In Situ Resolution and Overlay Measurement on a Stepper", Brunner et al., SPIE Vol. 565, Micron and Submicron Integrated Circuit Metrology, 1985, pp.6-13

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## U.S. PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE
	2002/0005947	1/2002	Golberg et al.			
	2002/0036775	3/2002	Wolleschensky et al.			
	2002/0041377	4/2002	Hagiwara et al.			
	2002/0062206	5/2002	Liebchen			
	2002/0067478	6/2002	Karpol et al.			
	2002/0070355	6/2002	Ota			

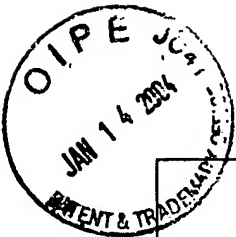
## FOREIGN PATENT DOCUMENTS

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## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	"Application of the Aerial Image Measurement System (AIMS™) to the Analysis of Binary Mask Imaging and Resolution Enhancement Techniques", Martino et al., SPIE Vol. 2197, 1994, pp.573-584
	"Optical Limitations to Cell Size Reduction in IT-CCD Image Sensors", Satoh et al., IEEE, Transactions on Electron Devices, Vol. 44, No. 10, Oct. 1997, pp.1599-1603
	"Direct Aerial Image Monitoring for Extreme Ultraviolet Lithography Systems", C.H. Fields, Ph.D. Dissertation Thesis, University of California, Berkeley, Spring 1997

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## U.S. PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE
	5,597,868	1/1997	Kunz			
	5,914,774	6/1999	Ota			
	5,891,959	4/1999	Kunz			
	5,973,316	10/1999	Ebbesen et al.			
	6,002,740	12/1999	Cerrina et al.			
	6,040,936	3/2000	Kim et al.			
	6,052,238	4/2000	Ebbesen et al.			
	6,236,033	5/2001	Ebbesen et al.			
	6,240,219	5/2001	Gregory			
	6,278,101	8/2001	Puyot			
	6,285,020	9/2001	Kim et al.			
	6,360,012	3/2002	Kreuzer			
	6,362,907	3/2003	Stone et al.			
	6,368,763	4/2002	Drksen et al.			
	6,515,272	2/2003	Fontaine et al.			

## FOREIGN PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION YES/NO
	WO 00/59206	10/2000	PCT			

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	"Extraordinary optical transmission through sub-wavelength hole arrays", Ebbesen et al., Nature, Vol. 391, Feb. 1998, pp., 1994, pp.667669

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## U.S. PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE
	2002/0105629	8/2002	Sandstrom et al.			
	2002/0122187	9/2002	Bruce et al.			
	2002/0134912	9/2002	Veneklasen et al.			
	2002/0145717	10/2002	Baselmans et al.			
	2002/0167651	11/2002	Boonman et al.			
	2002/0172876	11/2002	Baselmans			
	2003/0001107	1/2003	Kroon et al.			
	2003/0017805	1/2003	Yeung et al.			
	2003/0027057	2/2003	Schroeder et al.			
	2003/0042433	3/2003	Kamijo			

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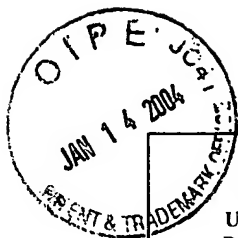
EXAMINER INITIALS	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE
	5,235,400	8/1993	Terasawa et al.			
	5,316,896	5/1994	Fukuda et al.			
	5,491,724	2/1996	Altes			
	5,638,211	6/1997	Shiraishi			
	5,700,601	12/1997	Hasegawa et al.			
	5,866,935	2/1999	Sogard			
	6,005,682	12/1999	Wu et al.			
	6,329,112	12/2001	Fukuda et al.			
	6,451,490	9/2002	Advocate et al.			
	6,534,798	3/2003	Scherer et al.			
	2002 0192598	12/2002	Hirayanagi			
	2003 0027366	2/2003	Dulman et al.			
	2003 0047694	3/2003	Van Der Laan			
	RE 36,509	1/2000	Shigihara			

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EXAMINER INITIALS	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE
	6,459,823	10/2002	Altunbasak et al.			

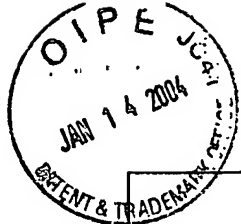
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## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	"Control of Optical Transmission Through Metals Perforated with Subwavelength Hole Arrays", Kim et al., Optics Letters, Vol. 24, No. 4, Feb. 1999, pp.256-258
	"Image Monitor for Markle-Dyson Optics", Grenville et al., Journal of Vacuum Science Technology B, Vol. 6, No. 11, Nov/Dec 1993, pp.2700-2704
	"A General Simulator for VLSI Lithography and Etching Processes: Part I -- Application to Projection Lithography", Oldham et al., IEEE Transactions on Electron Devices, Vol. ED-26, No. 4, April 1979, pp.717-722
	"High-Resolution Lithography with Projection Printing", H. Moritz, IEEE Transactions on Electron Devices, Vol. ED-26, No. 4, April 1979, pp.705-710
	"Contrast Studies in High-Performance Projection Optics", Oldham et al., IEEE Transactions on Electron Devices, Vol. ED-30, No. 11, Nov. 1983, pp.1474-1479
	"High Resolution, Low-Voltage Probes from a Field Emission Source Close to the Target Plane", McCord and Pease, Journal of Vacuum Science Technology B, Vol. 1, No. 3, Jan/Feb 1985, pp.198-201
	"Near-Field Optics: Microscopy, Spectroscopy, and Surface Modification Beyond the Diffraction Limit", Betzig and Trautman, Science, Vol. 257, July 1992, pp.189-195
	"Direct Aerial Image Measurement as a Method of Testing High Numerical Aperture Microlithographic Lenses", Partlo et al., Journal of Vacuum Science Technology B, Vol. 6, No. 11, Nov/Dec 1993, pp.2686-2691
	"Moire Technique for Overlay Metrology", Brunner and Smith, SPIE Integrated Circuit Metrology II, Vol. 480, 1984, pp164-170
	"In Situ Resolution and Overlay Measurement on a Stepper", Brunner and Allen, SPIE Micron and Submicron Integrated Circuit Metrology, Vol. 565, 1985, pp.6-13
	"Growth of Low-Defect Density In 0.25Ga0.75As on GaAs by Molecular Beam Epitaxy", Pickrell et al., Journal of Vacuum Science Technology B, Vol. 6, No. 18, Nov/Dec 2000, pp.2611-2614
	"Super-Resolved Surface Reconstruction From Multiple Images", Cheeseman et al., Technical Report FIA-94-12, NASA Ames Research Center, Dec. 1994
	"Monolithic Detector Array Comprised of >1000 Aerial Image Sensing Elements", Kunz et al., To be published in the SPIE Proceeding of the Microlithography, 2003

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	5,594,328	1/1997	Lukaszek			
	5,746,513	5/1998	Renken			
	6,542,835	4/2003	Mundt			

## FOREIGN PATENT DOCUMENTS

EXAMINER INITIALS	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB CLASS	TRANSLATION YES/NO
	WO 02/17030	2/2002	PCT			

## OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	"Initial Experiments on Direct Aerial Image Measurements in the Extreme Ultraviolet", Fields et al., Proc. OSA Trends in Optics and Photonics, Extreme Ultraviolet Lithography, Boston, MA, 1996
	"Autonomous On-Wafer Sensors for Process Modeling, Diagnosis, and Control", Freed et al., IEEE Transactions on Semiconductor Manufacturing, Vol. 14, No. 3, Aug. 2001, pp.255-264
	"Smart Dummy Wafers", Freed and Fisher, University of California, Berkeley, Presentation, May 1998
	"A Multi-Blanker for Parallel Electron Beam Lithography", G. Winograd, Ph.D. Dissertation, Stanford University, May, 2001
	"Wafer-Mounted Sensor Arrays for Plasma Etch Processes", M. Freed, Ph.D. Dissertation, University of California, Berkeley, Fall 2001

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